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ABSTRACT

The recent transition from industrial arts programs to technology education programs has occasioned the redesign of teacher education programs to meet the needs of future technology teachers. A national survey, conducted to improve the university course content in a technology teacher education curriculum for future junior high and high school teachers, contained 13 curriculum categories: English, sciences, mathematics, social sciences, humanities, communications, business, economics, engineering, computers, technical, education, and work experience. The University of Nevada's College of Education surveyed 186 "Best within Their State" technology teachers and 38 state supervisors of technology programs; 114 teachers and 27 supervisors responded. Most teachers (78.9%) indicated that they taught introduction to technology classes as part of their assignment. Large- and small-group instruction, paired students, individual student projects, and modular units were used by the teachers surveyed. Of the teachers surveyed, 88.6% used computer-aided instruction some of the time. Teachers and supervisors were asked to respond, via a Likert scale, to the perceived importance of 119 separate courses or course topics. The preferred course topics are listed by cluster on four attached tables. (NLA)

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# A NATIONAL SURVEY OF TECHNOLOGY TEACHERS TO DETERMINE THE TECHNOLOGY TEACHER EDUCATION CURRICULUM

By: Clifford R. McClain, Ph.D. and Mildred Zitello, M.Ed.

## Introduction

Within the recent years, occupational education has seen a nationwide shift from traditional industrial arts programs to the newly recognized programs in technology education, both at the junior high and high school levels. Unlike the old industrial arts programs which revolved around sawdust and solder projects emphasizing skill development through project construction in wood, metal or plastic, these new technology programs (introduction to technology and principles of technology) emphasize problem solving, thinking skills, and technological concepts using computers, simulators, role-playing, audio-visuals and a process rather than product orientation.

With this transition from industrial arts programs to technology programs, teacher education institutions have found themselves scrambling to redesign their programs in order to best meet the needs of future technology teachers. Many new technology education programs have already been developed or are being developed nationwide, however much of the formal change has generally been directed toward the educational pedagogy portion of the programs (i.e. curriculum and instruction). Of equal importance to the pedagogy content of a technology teacher education program are the general and technical education requirements.

This study was undertaken to identify and develop the content, not only of the teacher pedagogy portion, but the general education and technical training portions as well.

## Procedure

The Vocational/Technology Teacher Education program within The UNLV College of Education, in an attempt to update and improve its teacher training program, selected 186 technology teachers identified as "The Best Within Their State" by their respective State Supervisors to respond to a mailed questionnaire on university

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course offerings or content. Surveys were returned by 114 of these teachers for a return rate of 61.3%.

Similar surveys were also mailed to 38 State Supervisors of Technology Education, of which 27 surveys were returned for a 71.0% return rate. A total return rate of 62.9% was realized. No follow-up procedures were initiated.

This national survey was conducted in an effort to determine the university courses or course content which should be included in a technology teacher education curriculum for future junior high and high school teachers. Altogether, one hundred-nineteen separate courses were evaluated, grouped under thirteen curriculum categories. These categories were: English, sciences, mathematics, social sciences, humanities, communications, business & economics, engineering, computers, technical, education, and work experience.

## Results of the Study

### Demographic Analysis

To gain an insight into the sample of teachers and supervisors being surveyed, a brief set of demographic questions were provided. An analysis of the demographic data indicated that nearly 90% of those surveyed had four or more years of experience in their present position. Of the teachers surveyed, 38.5% taught at the junior high level only, 33.3% taught at the high school level only, and 19.2% taught at more than one level, including the post secondary level.

Of the teachers surveyed, 78.9% indicated they taught introduction to technology classes as part or all of their teaching assignments, 43.8% taught principles of technology classes as part or all of their teaching assignments, 13.2% taught traditional industrial arts classes as part or all of their teaching assignments, and 22.8 taught some non-vocational classes as part of their teaching assignments.

Large group instruction, small group instruction or paired students, individual student projects, and modular units (i.e. learning packets, learning stations, etc.) were all highly utilized by the teachers surveyed. However, competency-based methodology was utilized by less than a third of those surveyed.

Of the teachers surveyed, 88.6% utilize computer-aided instruction at least some of the time with Apple computers being used most frequently followed relatively closely by IBM/IBM clones, and with Macintosh placing a distant third.

The information gathered from the technology education supervisors mirrored very closely that gathered from the teachers.

Course/Course Content Analysis

The teachers and supervisors surveyed were asked to respond, using a Likert scale, to the perceived importance of 119 separate courses or course topics in preparing future technology teachers. These were clustered under 13 major headings. The scale utilized ranged from 1 (Very Important), 2 (Important), 3 (Limited Importance), and 4 (Not Important).

Descriptive statistics was utilized to determine a mean and standard deviation for each course or course topic listed on the survey instrument. Tables 1 through 4 list, in order of deciding importance, those courses receiving a mean score of 2.50 or higher.

## Summary/Conclusions

Oftentimes in teacher education circumstances necessitate a change in preparation programs to better meet the needs of future teachers. This is especially so in the area of vocational/technical education. Unfortunately many of these changes occur through informal, intuitive processes based upon the past experiences of the teacher educators making the changes. The data collected and presented in this paper should be of great aid to teacher educators in developing or overhauling suggested course of studies for technology teacher education programs.

## TABLE 1
## General Education Requirements

| COURSE/COURSE TOPIC | MEAN | S.D. |
|---|---|---|
| ***English:*** | | |
| Technical Writing | 1.55 | 0.66 |
| Composition Writing | 1.83 | 0.78 |
| Business Report Writing | 2.16 | 0.78 |
| ***Sciences:*** | | |
| General Physics | 1.41 | 0.61 |
| Physical Science | 1.64 | 0.72 |
| Laser phys./non-scientists | 1.77 | 0.74 |
| Cons./Natural Resources | 1.98 | 0.89 |
| Engineering physics | 1.99 | 0.85 |
| Environmental Science | 2.01 | 0.87 |
| General Chemistry | 2.07 | 0.82 |
| Physical Chemistry | 2.42 | 0.79 |
| ***Mathematics:*** | | |
| College Algebra | 1.57 | 0.82 |
| Logic | 2.20 | 0.77 |
| Precalculus | 2.35 | 0.98 |
| Statistics | 2.39 | 0.76 |
| ***Social Science:*** | | |
| Economics | 2.20 | 0.82 |
| Psychology | 2.27 | 0.90 |
| Sociology | 2.50 | 0.81 |
| ***Humanities:*** | | |
| History | 2.27 | 0.91 |
| Art | 2.50 | 0.80 |
| ***Communications:*** | | |
| Oral Communications | 1.24 | 0.51 |
| Audio-Visual Techniques | 1.30 | 0.58 |
| Sm. Group Communications | 1.32 | 0.58 |

**TABLE 2**

## Technical Education Requirements

| COURSE | Mean | S.D. |
|---|---|---|
| ***Business and Economics:*** | | |
| Management | 2.09 | 0.87 |
| Marketing | 2.14 | 0.89 |
| Basic Business | 2.22 | 0.86 |
| ***Engineering:*** | | |
| People and Technology | 1.26 | 0.53 |
| Manufacturing Processes | 1.27 | 0.56 |
| Engineering Design | 1.36 | 0.59 |
| Transportation Mechanics | 1.55 | 0.74 |
| Materials Mechanics | 1.58 | 0.79 |
| Mechanical Engineering | 1.62 | 0.74 |
| Fluid Mechanics | 1.65 | 0.72 |
| Surveying | 2.25 | 0.85 |
| ***Computers:*** | | |
| Computer Fundamentals | 1.05 | 0.30 |
| CAD/CAM | 1.21 | 0.54 |
| Computer Graphics | 1.30 | 0.56 |
| Telecommunications | 1.35 | 0.61 |
| Word Processing | 1.41 | 0.63 |
| Spreadsheet | 1.80 | 0.76 |
| Data Management | 1.84 | 0.77 |
| Intro to Programming | 1.91 | 0.89 |
| Computer Languages | 2.22 | 0.94 |
| ***Technical Courses:*** | | |
| Manufacturing/Processing | 1.38 | 0.64 |
| Electronics | 1.41 | 0.62 |
| Technical Drawing | 1.48 | 0.68 |
| Electricity | 1.54 | 0.72 |
| Construction | 1.67 | 0.77 |
| Media Technologies | 1.69 | 0.82 |
| General Power Mechanics | 1.74 | 0.77 |
| Architectural Drafting | 1.85 | 0.78 |
| Plastics | 1.91 | 0.81 |
| Blueprint Reading | 2.01 | 0.92 |
| Metal Fabrication/Welding | 2.07 | 0.87 |
| Surveying/Measurement | 2.29 | 0.87 |
| Auto Mechanics Systems | 2.30 | 0.85 |
| Woodworking | 2.40 | 0.90 |

## TABLE 3
## Teacher Education Requirements

| COURSE | Mean | S.D. |
|---|---|---|
| ***Education Courses:*** | | |
| Student Teaching | 1.21 | 0.53 |
| Principles of Tech Ed | 1.23 | 0.48 |
| Instructional Methods | 1.28 | 0.55 |
| Curriculum Development | 1.36 | 0.62 |
| Internship in Technology | 1.39 | 0.67 |
| Instructional Materials | 1.43 | 0.59 |
| Lab/Shop Management | 1.44 | 0.66 |
| Tests and Measurement | 1.70 | 0.74 |
| Orientation to Tech Ed | 1.73 | 0.81 |
| Educational Psychology | 1.81 | 0.80 |
| Foundations of Education | 1.96 | 0.89 |
| Career Education Methods | 2.04 | 0.82 |
| Occupational Special Needs | 2.07 | 0.79 |
| Cooperative Programs | 2.09 | 0.87 |
| School Law | 2.15 | 0.88 |
| Voc. Student Organizations | 2.17 | 0.88 |
| Manpower Needs/Job Analysis | 2.36 | 0.85 |

## TABLE 4
## Related Work Experience

| | Mean (yrs.) | S.D. |
|---|---|---|
| Related Work Experience (In Years) | 1.89 | 1.68 |